

MEMORANDUM

BASELINE TRAFFIC STUDY AND DESKTOP ANALYSES

PROPOSED BCR COAL VLAKFONTEIN MINE TO BE
SITUATED NEAR ERMELO AND BREYTEN, MPUMALANGA
PROVINCE



JULY 2022

Prepared for:

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VERIFICATION PAGE

PROJECT NAME:	PROPOSED BCR COAL VLAKFONTEIN MINE TO BE SITUATED NEAR ERMELO AND BREYTEN, MPUMALANGA PROVINCE	
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<u>Declaration by the registered professional:</u>		
The undersigned has been appointed as the registered professional for this Baseline Traffic Study and has applied due diligence to the content of this report and endeavoured to ensure that the Baseline Traffic Study is free of technical errors and takes full responsibility for its contents.		
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This report was prepared considering the requirements of Appendix 6 as set out in the National Environmental Management Act (NEMA) Regulations (2014) and as amended in 2017 as indicated in underneath table.

NEMA Regulations (2014) (as amended) - Appendix 6	Relevant section in report
Details of the specialist who prepared the report	Refer to page 2 and curriculum vitae attached as Appendix E.
The expertise of that person to compile a specialist report including a curriculum vitae	
A declaration that the person is independent in a form as may be specified by the competent authority	Refer to page 4.
An indication of the scope of, and the purpose for which, the report was prepared	Section 1, Page 8
An indication of the quality and age of base data used for the specialist report	Section 2.1 Traffic count data.
A description of existing impacts on the site, cumulative impacts of the Proposed Development and levels of acceptable change	Section 3 for existing impacts. Impacts of proposed project to be determined as part of further required investigations.
The duration date and season of the site investigation and the relevance of the season to the outcome of the assessment	Not relevant to traffic data.
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	To be determined as part of further required investigations.
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure inclusive of a site plan identifying site alternative	Section 2.5 for existing sensitivity. Sensitivity as part of proposed project to be determined as part of further required investigations.
An identification of any areas to be avoided, including buffers	Section 2.5.
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 2.5.
A description of any assumptions made and any uncertainties or gaps in knowledge;	To be determined as part of further required investigations.
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Section 3.
Any mitigation measures for inclusion in the EMPr	To be determined as part of further required investigations.
Any conditions for inclusion in the environmental authorisation	To be determined as part of further required investigations.
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and regarding the acceptability of the proposed activity or activities	
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
A description of any consultation process that was undertaken during the course of preparing the specialist report	Not relevant.
A summary and copies of any comments received during any consultation process and where applicable all responses thereto	None raised to date
Any other information requested by the competent authority.	Not relevant.


Requirements applied as part of this study when undertaking an Initial Site Sensitivity Verification for a site selected on the national web based environmental screening tool, for which no specific assessment protocol related to the Traffic theme has been identified, as indicated in underneath table.

Requirements for initial site sensitivity verification	Comment
The Initial Site Sensitivity Verification must be undertaken by an environmental assessment practitioner or a registered specialist with expertise in the relevant environmental theme being considered.	Refer to verification page (Page 2) for specialist details.
The Initial Site Sensitivity Verification must be undertaken through the use of:	
a) A desk top analysis, using satellite imagery.	Refer to section 2 of report.
b) A preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity	Refer to section 2 of report.

Declaration of Independence

I, Leon Roets, hereby declare that Siyazi Nkangala Transportation Services (Pty) Ltd, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Consultant name: Leon Roets

Signature: 

Date: 30 July 2022

EXECUTIVE SUMMARY

Siyazi Nkangala Transportation Services (Pty) Ltd. was appointed by Environmental Management Services (Pty) Ltd. (EMA) to conduct a Baseline Traffic Study (BTS) for the proposed BCR Coal Vlakfontein Mine to be situated near Breyten within the Msukaligwa Municipality, Mpumalanga Province. BCR Coal (Pty) Ltd (the applicant) is proposing an open pit mining operation to be known as the BCR Coal Vlakfontein Mine, hereafter referred to as the Proposed Mining Development, to be situated on Portions 2, 11, and 21 of Farm Vlakfontein 108 IT, and Portions 1, 7, 14, and 12 of Farm Welgelegen 107 IT.

In terms of conducting a Screening Report and requirements for a site sensitivity verification, no protocols are available for the identified traffic theme and therefore the purpose of the Baseline Traffic Study and Desktop Analyses is to assess the status quo of the relevant site of the Proposed Mining Development by means of:

- a) Determining the status quo of the relevant road network adjacent the Proposed Mining Development (Screening).
- b) Highlight the sensitivity in terms of the existing road network and vehicle traffic.
- c) Determine and identify any potential constrains for the Proposed Mining Development.
- d) Determine the need for a Traffic Impact Assessment from a traffic engineering point of view.

In order to determine the status quo of the existing adjacent road network and intersections in terms of vehicle traffic volumes and road safety, data was collected by means of manual vehicle traffic counts at potentially affected intersections as well as a visual inspection of the existing relevant road network and potential affected intersections by means of a site visit.

The following findings came out of the study:

- a) Access to and from the Proposed Mining Development would be possible from Road D1426 which is a gravel (unpaved) provincial class R4 road. Three viable access options (options 2, 3 and 4) were identified, with option 3 deemed as the most suitable point of access based on the available sight distances, the proposed layout of the Proposed Mining Development (where infrastructure will be located), and from a road geometric perspective.
- b) Currently Road D1426 is in a poor state from the northern boundary of the Proposed Mining Development (Point B) up to Point C.
- c) In general, no public transport is available within the area of the Proposed Mining Development along Road D1426, with the nearest possible public transport operations available being approximately 16 kilometres to the north of the Proposed Mining Development at Breyten. Depending on where workers will be sourced from, workers of the Proposed Mining Development might have difficulties to get to and from work if making use of public transport.
- d) The existing intersections investigated (Points A and C) does not have dedicated right-turn lanes.
- e) Intersection performance evaluations concluded that the relevant existing intersections with existing vehicle traffic volumes are currently operating at acceptable levels of service and would remain relevant for at least the next ten years with an anticipated background vehicle traffic growth (which includes latent developments) of 3% per annum.
- f) Reserve vehicle capacity along Roads N17, R36 and D1426 is available and is anticipated to remain relevant for the next ten years.

The following table provide a summary of the desktop verification outcome.

ELEMENT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/P LAIN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Road Safety: Vehicle/non-motorized transport conflict	No protocol.	Low	Low number of non-motorized movement observed in area. No further input required.	Section 2.6.
Road Safety: Need for dedicated turning lanes	No protocol.	Low	No dedicated turning lanes provided at Points A and C, not currently required due to low vehicle volumes. Assess change with the anticipated vehicle traffic to be generated by the Proposed Mining Development.	Table 2.8.
Road Safety: High volumes of vehicular traffic conflicts (turning movements)	No protocol.	Low	Currently low volume of vehicle traffic in area. Assess change with the anticipated vehicle traffic to be generated by the Proposed Mining Development.	Section 2.1.3.
Pavement Condition (Road D1426)	No protocol.	Medium	Road D1426 is a gravel road (unpaved). Visually the road is in a poor condition between Points B and C. Depending on the intended load on the roadway, a Pavement Design Specialist will have to comment on the road.	Table 2.8.
Speeding	No protocol.	Low	No excessive speeding was observed on relevant road sections under investigation. No further input required.	Not relevant.

Based on the relevant information gathered, assessments and analyses done in terms of the traffic related status-quo of the relevant road network adjacent to the Proposed Mining Development, the following could be concluded for the baseline:

- a) A Traffic Impact Assessment would need to be conducted due to information on the anticipated number of vehicle trips to be generated by the Proposed Mining Development during the operational phase not being available at the time of preparing this report. The requirement of whether further investigations would be required could not be based on calculations. Therefore, the recommendation had to be made based on professional experience obtained from several similar projects completed. Coal mining developments where no rail infrastructure is available generate a noticeable number of vehicle trips, mainly due to the activities of trucks transporting coal off-site to customers.

- b) The following should be determined as part of a Traffic Impact Assessment for the dedicated area with the Proposed Mining Development:
 - i) Determination of vehicle trips expected to be generated by the Proposed Mining Development.
 - ii) Determination of anticipated traffic to be generated at the intersections under investigation.
 - iii) Determination of Levels of Service at the relevant intersections with the Proposed Mining Development (Intersection performance).
 - iv) Determination of mitigating measures required as part of the Proposed Mining Development.
 - v) Determine road related impact due to the Proposed Mining Development.
- c) Anticipated vehicle traffic to be generated by the Proposed Mining Development, with specific reference to heavy vehicles transporting coal, would have an impact on the existing gravel road, Road D1426. This could contribute to the deteriorating condition of the roadway and could lead to the Proposed Mining Development not being accessible via Road D1426 should the road not be maintained. The last mentioned is regarded as a potential constraint and fatal flaw should Road D1426 not be maintained.
- d) No further road related constraints, fatal flaws or red flags that could have an impact on the feasibility of the Proposed Mining Development are envisaged or could be identified as part of this study for the existing road network in terms of road safety and capacity.

Furthermore, the following recommendations are made from a traffic engineering point of view and need to form part of the EIA process:

- a) It is recommended that a full Traffic impact Assessment be prepared in order to assess the potential road related impact that the transportation of coal from the Proposed Mining Development would have on the relevant intersections under investigation from a road capacity and safety perspective, and to determine the required mitigating measures in order to mitigate the potential road related impact that the Proposed Mining Development might have.
- b) Further investigation at the relevant proposed access intersection to and from the Proposed Mining Development should be conducted regardless of whether Access options 2, 3 or 4 will be implemented in order to determine the intersection performance (impact) of the anticipated vehicle trips to be generated by the Proposed Mining Development.
- c) Further investigation is recommended for on-site traffic related matters which include vehicle circulation and parking layouts.

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SECTION 1

1. INTRODUCTION

Siyazi Nkangala Transportation Services (Pty) Ltd. was appointed by Environmental Management Services (Pty) Ltd (EMA) to conduct a Baseline Traffic Study (BTS) for the proposed BCR Coal Vlakfontein Mine to be situated near Breyten within the Msukaligwa Municipality, Mpumalanga. BCR Coal (Pty) Ltd (the applicant) is proposing an open pit mining operation to be known as the BCR Coal Vlakfontein Mine, hereafter referred to as the Proposed Mining Development, to be situated on:

- a) Portions 2, 11, and 21 of Farm Vlakfontein 108 IT.
- b) Portions 1, 7, 14, and 12 of Farm Welgelegen 107 IT.

The surface sub-outcrop of the coal seams is planned to be mined using an advancing open pit mining method which allows for concurrent filling of the pit. The pit will be used to develop portals which will allow the remainder of the ore to be exploited using underground mining methods. The open pit planned applies a conventional opencast truck and shovel mining philosophy including the following steps:

- a) Removal of topsoil and storing it at a designated position.
- b) Removal of the overburden.
- c) Drilling and blasting will be required to break the hard overburden.
- d) The waste will be dumped in the pit behind the advancing face where possible with the remainder placed at the designated waste rock stockpile, separate from the topsoil.
- e) Drilling and blasting of the coal seams.
- f) Loading and hauling of the ore for stockpiling at the Run-of-Mine (ROM) pad and for transport to the preferred Washing Plant.

The project footprint will require support facilities and infrastructure to operate, therefore infrastructure requirements are:

- a) Access & Haul roads (with necessary security) including the upgrading of the access point to mining area.
- b) Contractor's Yard with septic/chemical ablution facilities.
- c) Offices.
- d) Weighbridge, workshop, and stores (with septic/chemical ablution facilities).
- e) Diesel facilities and a hardstand.
- f) Power and Water.
- g) Stockpiles (topsoil, overburden (waste), subsoil/softs, ROM).
- h) Crushing and screening facility.
- i) Surface water management measures (stormwater diversion berms and trenches; pollution control dams etc).
- j) Medical station.
- k) Diesel Generator.

In terms of conducting a Screening Report and requirements for a site sensitivity verification, no protocols are available for the identified traffic theme and therefore the purpose of the Baseline Traffic Study and desktop analyses is to assess the status quo of the relevant site of the Proposed Mining Development by means of:

- a) Determining the status quo of the relevant road network adjacent the Proposed Mining Development (Screening).
- b) Highlight the sensitivity in terms of the existing road network and vehicle traffic.
- c) Determine and identify any potential constrains for the Proposed Mining Development.
- d) Determine the need for a Traffic Impact Assessment from a traffic engineering point of view.

Preparation of a Traffic Impact Assessment is guided by guidelines published by the Committee of Transport Officials (COTO), of which these guidelines have been adopted by all relevant road authorities as instructed by the Department of Transport. The manuals contain requirements for Traffic Impact Assessments (TIAs) and Site Traffic Assessments (STAs) in South Africa. Requirements are provided for aspects such as responsibilities and submission of traffic assessments as well as assessment standards. Refer to Section 3.3 of this report for more detailed information on requirements.

Figure 1.1 provides the locality of the Proposed Mining Development in relation to other activities in the vicinity, including the location of the potentially affected intersections under investigation as part of this study.

Table 1.1 provides a summary of information on the Proposed Mining Development in terms of the planned construction, operations, and timelines. It is important to take note that the anticipated timeline as depicted by the last-mentioned table provides an estimated timeline in terms of months and/or years for the construction and operational phases and does not depict the exact month and/or year that construction and operations are planned.

The following sections of the report elaborate on the:

- a) **Section 2:** Detailed information related to data collected and investigations.
- b) **Section 3:** Findings and recommendations of the existing road network and the identified potential road related constraints for the Proposed Mining Development.

POINT	INTERSECTION STATUS	INTERSECTION	GPS CO-ORDINATES	
			LATITUDE	LONGITUDE
A	Existing	Roads N17 and D1426	S 26°23'12.34"	E 30° 4'50.86"
B	Proposed	Road D1426 and Proposed Mining Development Access Road	To be determined	
C	Existing	Roads R36, D1426, and Breyten Access Road	S 26°17'59.68"	E 30° 0'1.12"

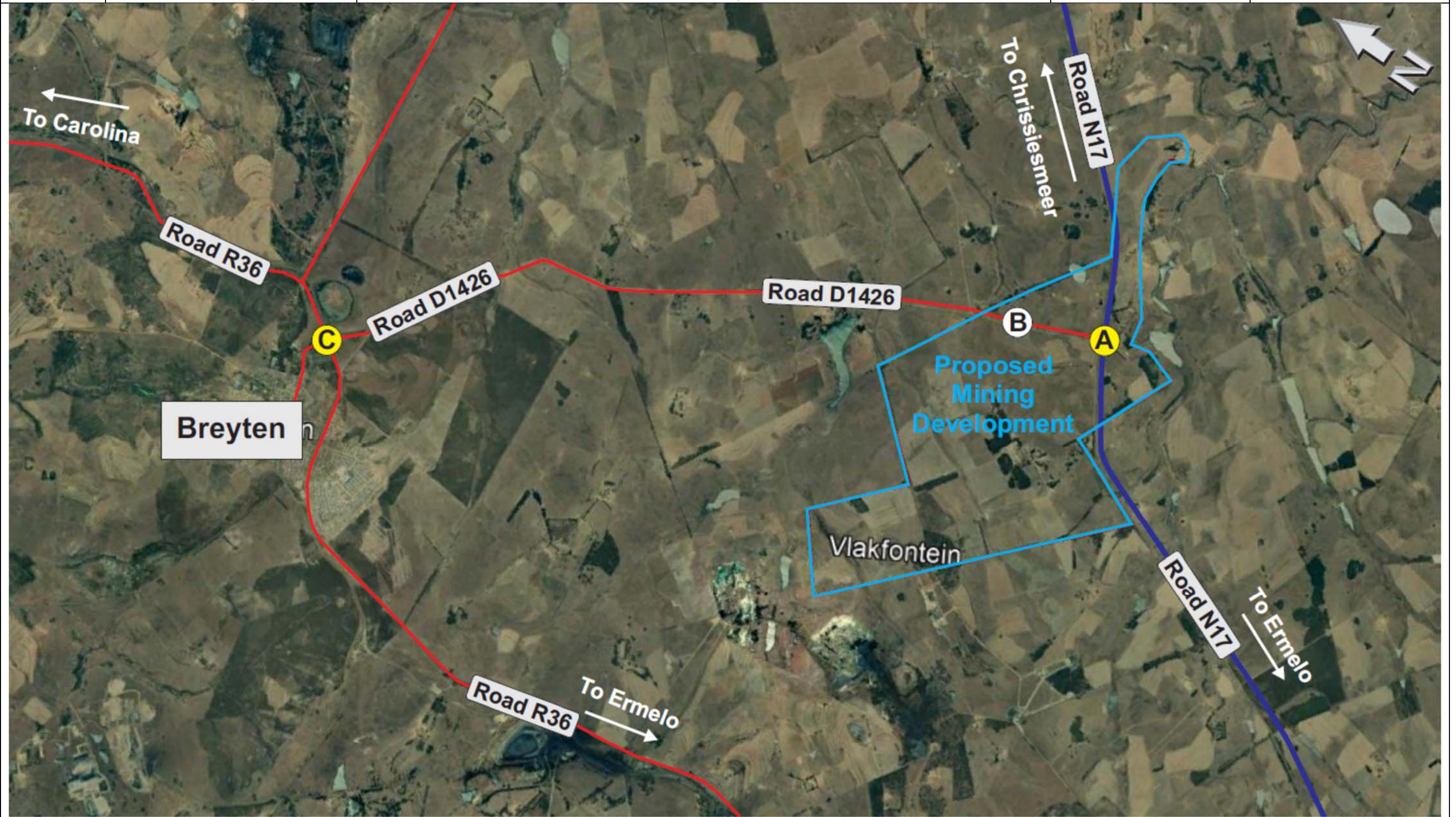


FIGURE 1.1: LOCALITY OF THE PROPOSED DEVELOPMENT AND RELEVANT INTERSECTIONS UNDER INVESTIGATION

TABLE 1.1: SUMMARY OF THE EXTENT OF THE PROPOSED PROJECT FOR THE RESPECTIVE PHASES

DESCRIPTION	PHASE	
	CONSTRUCTION	OPERATIONAL
Duration of phase.	Maximum 6 months.	19.5 years.
Expected number of heavy vehicles delivering consumables and plant materials per month.	8 per month.	4 per month.
Expected percentage of heavy vehicles delivering consumables or plant materials during traffic peak times.	25%.	25%.
Number of construction staff per day.	29 per day.	Not relevant.
Number of shifts for construction staff per day.	1 shift per day.	Not relevant.
Number of workers per day.	Not relevant.	Information to be finalized.
Where staff are anticipated to reside.	Nearby towns/villages.	
Abnormal vehicles delivering large components.	Once-off events.	Once-off events.
Access road to Proposed Mining Development.	Direct Access from Road D1426.	Same as for Construction Phase.

Section 2

2. DETAILED INFORMATION RELATED TO DATA COLLECTED AND INVESTIGATIONS

The purpose of **Section 2** is to provide detailed information related to the data collected and investigations and consists of:

- a) The *status quo* of the land use and road network characteristics of roads relevant to the Proposed Mining Development which consists of the following information:
 - i. Existing land use information.
 - ii. Existing road characteristics and modal distribution.
 - iii. Traffic counts as a basis for making traffic-engineering calculations.
- b) The future land use and road network characteristics relevant to the Proposed Mining Development which consists of the following information:
 - i. Land use information, including existing and proposed approved future developments in the area.
 - ii. Determination of vehicle trips expected to be generated due to the Proposed Mining Development.
- c) Access to and from the Proposed Mining Development.
- d) The current levels of service at the relevant intersections under investigation.
- e) Other traffic-related matters.

2.1 STATUS QUO OF LAND USE, AS WELL AS ROAD NETWORK CHARACTERISTICS

The following information is discussed in terms of the *status quo* of the existing land use and road characteristics:

- a) Existing land use information.
- b) Existing road characteristics and modal distribution.
- c) Traffic counts conducted as a basis for making traffic calculations.

2.1.1 EXISTING LAND USE INFORMATION

The relevant property of the Proposed Mining Development is currently mostly vacant with some agricultural activities taking place, and some residential dwellings on the farms (Farmhouses). For the purpose of this Baseline Traffic Study, it is assumed that the vehicle traffic absorption rate (rate at which existing developments attract vehicular traffic) by all other types of completed developments will maintain the same status for the next ten years.

2.1.2 EXISTING ROAD CHARACTERISTICS AND MODAL DISTRIBUTION

The following are relevant as part of this section:

- a) **Figure 2.1** provides the existing road network layout for the area under investigation.
- b) **Table 2.1** contains information related to the existing and proposed intersections under investigation.
- c) **Table 2.2** provides information concerning the relevant road sections under investigation and includes the following:
 - i) Relevant road section.
 - ii) Picture of road section.
 - iii) Existing class of road.
 - iv) Proposed class of road.
 - v) Road reserve widths.
 - vi) Lane widths.
 - vii) Median widths (if relevant).
- d) **Tables 2.3** and **2.4** provide information on typical road characteristics and access management requirements as per the guideline COTO TRH26 “*South African Road Classification and Access Management Manual, Version 1.0, August 2012*” Rural areas.

TABLE 2.1: SUMMARY OF INTERSECTION CONTROL AT EXISTING INTERSECTIONS UNDER INVESTIGATION






POINT	DESCRIPTION	INTERSECTION CONTROL	PEDESTRIAN ACTIVITIES	INTERSECTION PHOTO
A	Roads N17 and D1426	Free flow along Road N17	No Pedestrian activity observed during surveys	
B	Road D1426 and Proposed Mining Development Access Road	Proposed intersection.		
C	Roads R36, D1426, and Breyten Access Road	Free flow along Road R36	Pedestrian activity observed during surveys	

TABLE 2.2: SUMMARY OF ROAD CHARACTERISTICS

RELEVANT ROAD SECTION	PICTURE OF ROAD SECTION	EXISTING FUNCTIONAL CLASS OF ROAD			PROPOSED FUNCTIONAL CLASS OF ROAD			Road Authority	Road Reserve (m)	Number of Lanes	Lane Width	Type of Surface	Median	Anticipated Traffic Growth per Annum over 10 Years	Speed Limit
Road Section 1 Road N17 National Road linking Ermelo with Bethal and Eswatini Border		Primary Function: Mobility			Proposed Function: Mobility			SANRAL	±40m	One lane per direction	3.7m wide	Asphalt	None.	3%	120km/h
		Class	Class No.	Route Number	Class	Class No.	Route Number.								
		Major Arterial	R2	R	Major Arterial	R2	R								
		Description: Highway			Description: Highway										
		Spacing between Intersections: 5km			Spacing between Intersections: 5km										
Road Section 2 Road R36		Primary Function: Mobility			Proposed Function: Mobility			Mpumalanga Department of Public Works, Roads, and Transport	±30m	One lane per direction	3.5m wide	Asphalt	None.	3%	100km/h
		Class	Class No.	Route Number	Class	Class No.	Route Number.								
		Major Arterial	R2	R	Major Arterial	R2	R								
		Description: Highway			Description: Highway										
		Spacing between Intersections: 5km			Spacing between Intersections: 5km										

Note: Information on Classification of relevant roads obtained from the Mpumalanga Department of Public Works, Roads, and Transport GIS database.

TABLE 2.2: SUMMARY OF ROAD CHARACTERISTICS

RELEVANT ROAD SECTION	PICTURE OF ROAD SECTION	EXISTING FUNCTIONAL CLASS OF ROAD			PROPOSED FUNCTIONAL CLASS OF ROAD			Road Authority	Road Reserve	Number of Lanes	Lane Width	Type of Surface	Median	Anticipated Traffic Growth per Annum over 5 Years	Speed Limit
Road Section 3 Road D1426		Primary Function: Access / Activity			Proposed Function: Access / Activity			Mpumalanga Department of Public Works, Roads, and Transport	±20m	One lane per direction	3.5m wide	Gravel	None.	3%	60km/h
		Class	Class No.	Route Number	Class	Class No.	Route Number.								
		Collector road	R4	T or D	Collector road	R4	T or D								
		Description: Collector			Description: Collector										
		Spacing between Intersections: 600 – 800m			Spacing between Intersections: 600 – 800m										

Note: Information on Classification of relevant roads obtained from the Mpumalanga Department of Public Works, Roads, and Transport GIS database.

TABLE 2.3: RURAL FUNCTIONAL ROAD CLASIFICATION
 (COTO TRH26 - SOUTH AFRICAN ROAD CLASIFICATION AND ACCESS MANAGEMENT MANUAL VERISON 1.0 AUGUST 2012)

FUNCTION			DESCRIPTION		MOBILITY				
BASIC FUNCTION	ALTERNATE FUNCTIONAL DESCRIPTION	DETERMINING FUNCTION	CLASS NO (R_)	CLASS NAME	ORIGIN / DESTINATION	THROUGH TRAFFIC COMPONENT	REACH OF CONNECTIVITY	% OF BUILT KM	AADT (AVERAGE ANNUAL DAILY TRAFFIC)
Mobility	Vehicle priority, vehicle only, long distance, through, high order, high speed, numbered, commercial, economic, strategic; route, arterial road or highway	Movement is dominant, through traffic is dominant, the majority of traffic does not originate or terminate in the immediate vicinity, the function of the road is to carry high volumes of traffic between urban areas.	R 1	Principal Arterial*	Metro areas, large cities, large border posts, join national routes.	Exclusively	> 50km	2 - 4% Classes 1 and 2	1 000 - 100 000+
			R 2	Major Arterial*	Cities and large towns, transport nodes (harbour and international airports), smaller border posts, join major routes.	Exclusively	> 25km		500 - 25 000+
			R 3	Minor Arterial*	Towns, villages and rural settlements, tourist destinations, transport nodes (railway sidings, seaports, landing strips), small border posts, other routes.	Predominant	> 10km	6 - 12% Classes 1, 2 and 3	100 - 2 000+
Access / Activity	Access, mixed pedestrian and vehicle traffic, short distance, low order, lower speed, community / farm, road or street.	Access, turning and crossing movements are allowed, the majority of traffic has an origin or destination in the district, the function of the road is to provide a safe environment for vehicles and pedestrians using access points.	R 4	Collector Road	Connect farming districts, rural settlements, tourist areas, national and private parks and mines to mobility routes.	Minimal	< 10km	20 - 25%	< 1 000
			R 5	Local Road	Farm or property access, connection to other routes.	Nil Discontinued	< 5km	65 - 75%	< 500
			R 6	Walkway (Path or Track)	Settlements, farms, transport nodes, water points.	n/a	n/a	n/a	n/a

* In rural areas, the term distributor may be preferred to arterial.

TABLE 2.4: RURAL ACCESS MANAGEMENT REQUIREMENTS AND FEATURES
 (COTO TRH26 - SOUTH AFRICAN ROAD CLASSIFICATION AND ACCESS MANAGEMENT MANUAL VERSION 1.0 AUGUST 2012)

BASIC FUNCTION	DESCRIPTION		REQUIREMENTS				TYPICAL FEATURES (Use appropriate context sensitive standards for design)									
	CLASS NO (R_)	CLASS NAME	DESIGN TOPOLOGY	ROUTE NO,	ACCESS TO PROPERTY	PARKING	SPEED km/h	INTERSECTION CONTROL	INTERSECTION SPACING	TYPICAL CROSS SECTION	ROADWAY / LANE WIDTH	ROAD RESERVE WIDTH	PUBLIC TRANSPORT AND PEDESTRIAN CROSSINGS	PEDESTRIAN FOOTWAYS (CONSTRUCTED)	CYCLE LANES	ANIMAL DRAWN VEHICLES
Mobility	R 1	Principal arterial	Expressway	Yes (N)	Not allowed*	No (off road rest stops allowed)	120	Grade separated or priority to through	8.0km	2/3/4 lane, surfaced shoulders, climbing lanes	3.5 - 3.7m	60 - 80m (62m)	No	No	No	No
	R 2	Major arterial	Highway	Yes (R: 2 or 3-digit; or N)	Not allowed **	No (off road rest stops allowed)	120	Priority or grade separated	5.0km	2/3 lane, surfaced shoulders, climbing lanes	3.5 - 3.7m	40-70m (48m)	As required	Isolated	Recreational on shoulder	No
	R 3	Minor arterial	Main road	Yes (R: 3 or 2-digit)	Not allowed **	No (off road rest stops allowed)	100 - 120	Priority, roundabout	1.6km	2 lane surfaced, gravel shoulders	4.0m	30-50m (30m)	As required	Isolated	Recreational widen roadway both sides	Widen shoulder
Access / Activity	R 4	Collector road	Collector	Allowed, T (tourist) or D (district)	Yes	No (off road edge or in lay bays / viewpoints)	80 - 100	Priority	600 - 800m	2 lane surfaced or gravel, gravel shoulders	3.5m	25m	As required	Rare, isolated	Widen roadway	Widen shoulder
	R 5	Local road	Farm road	Allowed, T (tourist) or L (local)	Yes	No (on verge or shoulder)	60 - 80	Priority	450 - 600m	1/2 lane gravel, 600mm concrete strips in environmental areas		20m	As required	Rare	Use roadway	Use roadway
	R 6	Walkway	Track or pathway	No	Yes	n/a			N/a					Not constructed, formed by use		

* Access to properties sufficiently large to warrant a private intersection / interchange can be considered if access spacing requirements met and there is no future need for public road.

** Low volume farm gate and tourist access (less than 10 vehicles per day) can be considered if no alternative exists.

2.1.3 TRAFFIC COUNTS AS BASIS FOR MAKING TRAFFIC-ENGINEERING CALCULATIONS

To gain a better understanding of the existing traffic patterns and movements adjacent to the Proposed Mining Development, a 12-hour manual traffic count was conducted at the relevant intersections under investigation. It is standard traffic engineering practice to conduct at least 12-hour manual traffic counts, as close as possible to a month-end Friday when traffic movement is expected to be at its highest.

The relevant 12-hour manual traffic count was conducted on Friday 01 July 2022 at the following points:

- a) **Point A:** Intersection of Roads N17 and D1426.
- b) **Point C:** Intersection of Roads R36, D1426, and Breyten Access Road.

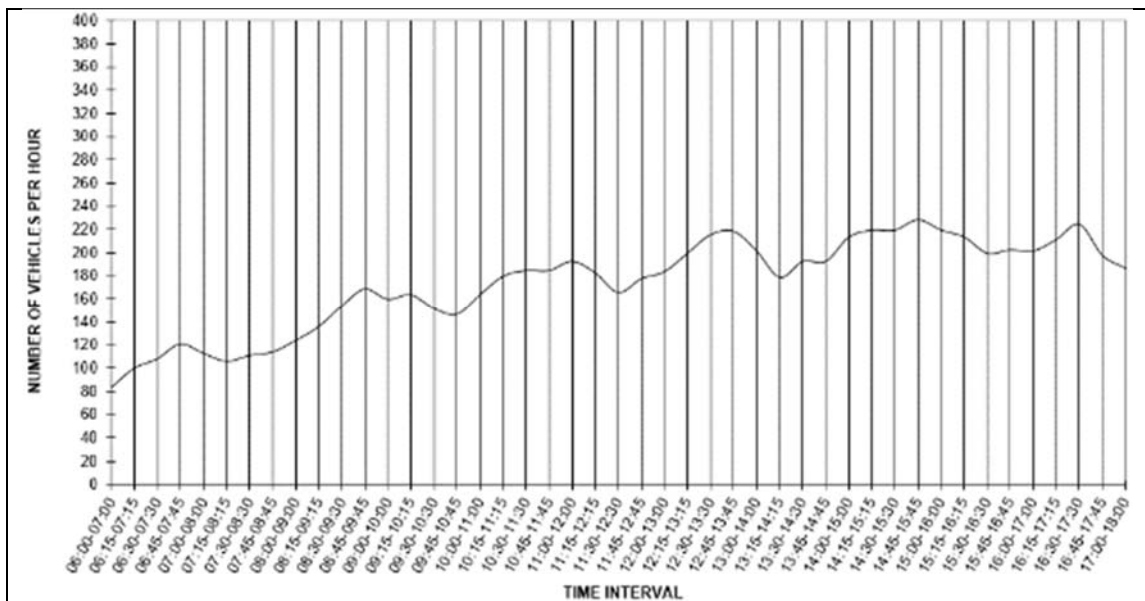
The combined hourly totals of all the vehicle types for the traffic survey conducted on Friday 01 July 2022 between 06:00 and 18:00 are indicated in **Tables A-1** and **A-2** of **Appendix A** of this report. The description of the relevant vehicle movements at the relevant intersection appears in **Figures A-1** of **Appendix A**. **Figure B-1** provides a graphical presentation of the peak-hour traffic volumes as derived from the relevant manual traffic counts.

The respective peak-hour flows for the traffic count at the relevant intersections were identified as indicated in **Table 2.5** below.

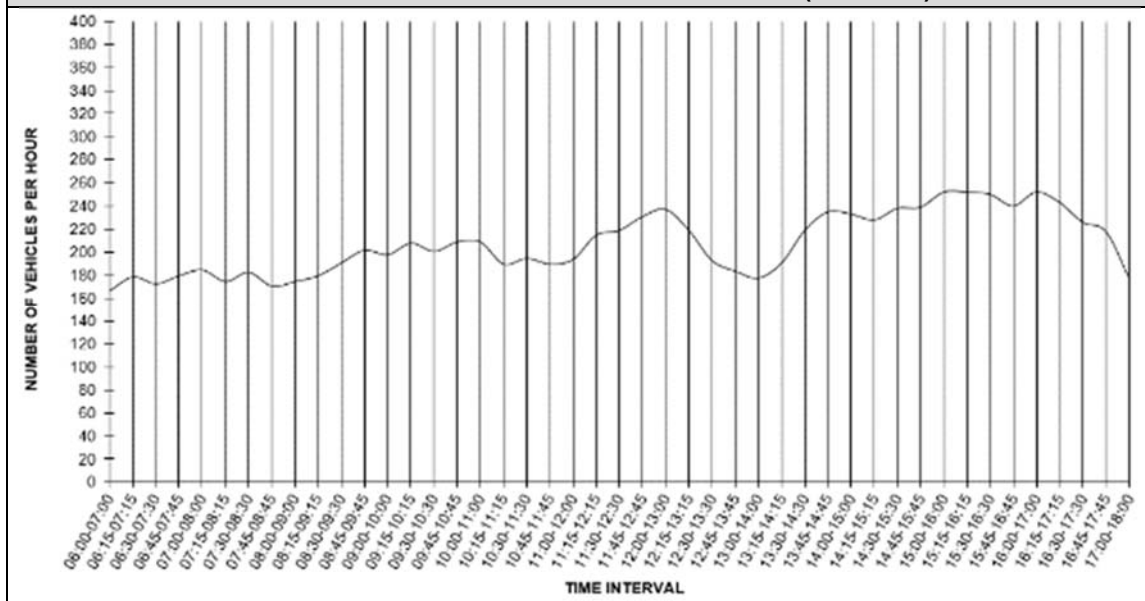
TABLE 2.5: PEAK HOUR PERIODS AT THE RELEVANT INTERSECTIONS					
POINT	INTERSECTION	AM PEAK		PM PEAK	
		TIME INTERVAL	NUMBER OF VEHICLES	TIME INTERVAL	NUMBER OF VEHICLES
A	Roads N17 and D1426	06:45 to 07:45	121	16:30 to 17:30	225
C	Roads R36, D1426, and Breyten Access Road	07:00 to 08:00	185	16:00 to 17:00	252

Note: It is important to take note that the identified peak hour periods between **Points A** and **C** are different due to the roads being parallel to each other and 16 kilometres apart and located on two different functional roadways. Points A and B is located in rural areas. No nearby towns are near Point A, while Point B is located at one of the access roads to Breyten.

Figure 2.2 indicates the hourly traffic pattern, per 15-minute interval, for all modes of vehicles at the relevant intersections between 06:00 and 18:00 on 01 July 2022.



INTERSECTION OF ROADS N17 AND D1426 (POINT A)



INTERSECTION OF ROADS R36, D1426, AND BREYTEN ACCESS ROAD (POINT C)

FIGURE 2.2: HOURLY TRAFFIC PATTERN PER 15-MINUTE INTERVAL FOR ALL MODES OF VEHICLES (06:00 TO 18:00) AT THE RELEVANT INTERSECTIONS

2.2 FUTURE LAND USE AND ROAD CHARACTERISTICS

The following are relevant:

- a) Future land use information, including existing and proposed approved future developments in the area.
- b) Determination of the vehicle trips anticipated to be generated by the Proposed Mining Development.

The sections below elaborate on future land use and road characteristics.

2.2.1 FUTURE LAND USE INFORMATION, INCLUDING EXISTING AND PROPOSED APPROVED FUTURE DEVELOPMENTS IN THE AREA

At the time of conducting this study, there were no approved latent developments identified within the area under investigation that would have a significant impact on the relevant road network adjacent to the Proposed Mining Development.

2.2.2 DETERMINATION OF VEHICLE TRIPS EXPECTED TO BE GENERATED DUE TO THE PROPOSED MINING DEVELOPMENT

At the time of conducting baseline investigations and preparing this report, the final information on the anticipated vehicle traffic to be generated by the Proposed Mining Development was not available. Further input with regards to the last mentioned would therefore be required at a later stage as part of a full Traffic Impact Assessment, should it be required.

The trip generation rates will be based on the “*COTO TMH17, South African Trip Data Manual Version 1.01, September 2013*”, information provided by the project team and assumptions to be made based on professional experience where information is not available.

2.3 ACCESS TO AND FROM THE PROPOSED MINING DEVELOPMENT

Vehicle access to and from the Proposed Mining Development would be required from Road D1426. Four access options were investigated as part of the Baseline Traffic Study in order to determine the most suitable point of access.

Tables 2.6.1 to 2.6.4 provides information in terms of the sight distances and viability of the potential access options from Road D1426 to and from the Proposed Mining Development, to assist in the decision-making process as part of the detail input and design phases, while **Figure 2.3** provides a graphical presentation of the identified proposed access options.

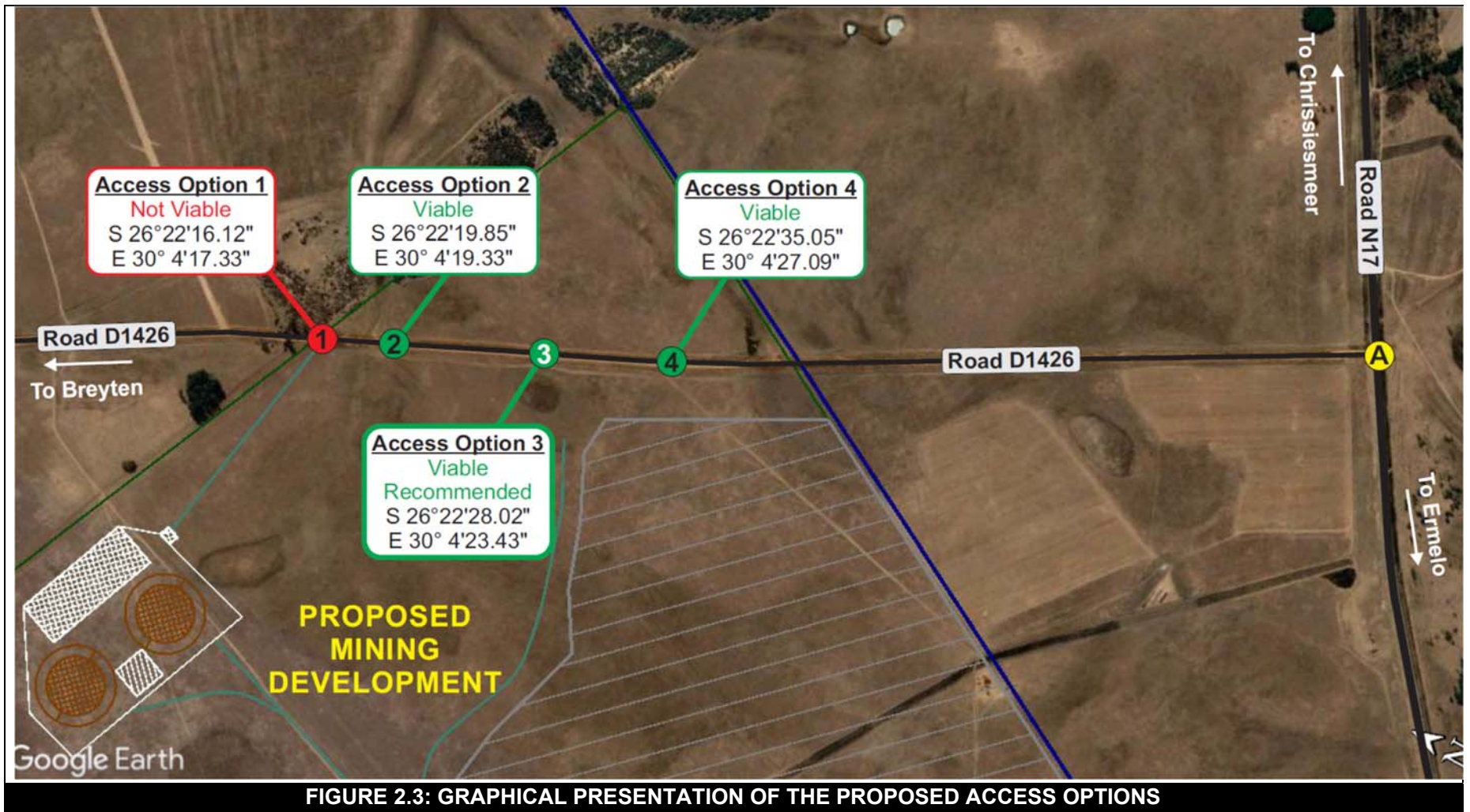




TABLE 2.6.1: AVAILABLE INTERSECTION STOPPING AND DECISION SIGHT DISTANCE AT ACCESS OPTION 1 ALONG ROAD D1426		
Viability of Access Point	Option 1: Not viable due to sight distance constraints.	
Road Type	Gravel	
Relevant Pictures		
	Road D1426 Northbound	Road D1426 Southbound
Coordinates	S 26°22'16.12"	E 30° 4'17.33"
Required Stopping Sight Distance at recommended 60 km/h	85m	85m
Available Stopping Sight Distance	Less than 85m	More than 85m
Required Decision Sight Distance at 60 km/h	170m	170m
Available Decision Sight Distance	Less than 170m	More than 170m

TABLE 2.6.2: AVAILABLE INTERSECTION STOPPING AND DECISION SIGHT DISTANCE AT ACCESS OPTION 2 ALONG ROAD D1426



Viability of Access Point	Option 2: Viable.	
Road Type	Gravel	
Relevant Pictures		
	Road D1426 Northbound	Road D1426 Southbound
Coordinates	S 26°22'19.85"	E 30° 4'19.33"
Required Stopping Sight Distance at recommended 60 km/h	85m	85m
Available Stopping Sight Distance	More than 85m	More than 85m
Required Decision Sight Distance at 60 km/h	170m	170m
Available Decision Sight Distance	More than 170m	More than 170m

TABLE 2.6.3: AVAILABLE INTERSECTION STOPPING AND DECISION SIGHT DISTANCE AT ACCESS OPTION 3 ALONG ROAD D1426 (RECOMMENDED ACCESS POINT)





Viability of Access Point	Option 3: Viable, recommended point of access from traffic engineering perspective.	
Road Type	Gravel	
Relevant Pictures		
	Road D1426 Northbound	Road D1426 Southbound
Coordinates	S 26°22'28.02"	E 30° 4'23.43"
Required Stopping Sight Distance at recommended 60 km/h	85m	85m
Available Stopping Sight Distance	More than 85m	More than 85m
Required Decision Sight Distance at 60 km/h	170m	170m
Available Decision Sight Distance	More than 170m	More than 170m

TABLE 2.6.4: AVAILABLE INTERSECTION STOPPING AND DECISION SIGHT DISTANCE AT ACCESS OPTION 4 ALONG ROAD D1426		
Viability of Access Point	Option 4: Viable.	
Road Type	Gravel	
Relevant Pictures		
	Road D1426 Northbound	Road D1426 Southbound
Coordinates	S 26°22'35.05"	E 30° 4'27.09"
Required Stopping Sight Distance at recommended 60 km/h	85m	85m
Available Stopping Sight Distance	More than 85m	More than 85m
Required Decision Sight Distance at 60 km/h	170m	170m
Available Decision Sight Distance	More than 170m	More than 170m

Access can potentially be provided for options 2, 3 and 4 from and to Road D1426. Access option 3 is deemed as the most suitable and therefore the recommended point of access based on:

- a) The available sight distances.
- b) The proposed layout of the Proposed Mining Development (where infrastructure will be located).
- c) From a road geometric perspective.

Stopping and decision sight distance requirements are guided by the “*Committee of Transport Official TMH 16 Volume 2 South African Traffic Impact and Site Traffic Assessment Standards and Requirements Guideline version 1.01 February 2014*”.

2.4 DETERMINATION OF THE LEVELS OF SERVICE AT THE RELEVANT INTERSECTIONS

The **SIDRA Intersection** software was used as an aid for the design and evaluation of the relevant intersections. The evaluations determine the intersection levels of service (LOS) which qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, manoeuvrability, delay, and safety.

The following intersections were evaluated as part of this investigation:

- a) **Point A:** Intersection of Roads N17 and D1426.
- b) **Point C:** Intersection of Roads R36, D1426, and Breyten Access Road.

In **Appendix C, Tables C-1 and C-2** indicate the levels of service and the degree of saturation calculated for the relevant intersections for the respective scenarios:

- a) **Table C-1:** Levels of service for various approaches for the year 2022 (background traffic) **without** the Proposed Mining Development (**Scenario 1**).
- b) **Table C-2:** Levels of service for various approaches for the year 2032 **without** the Proposed Mining Development (**Scenario 2**).

From **Tables C-1 and C-2** it is possible to note from the relevant evaluations as part of the existing vehicle traffic conditions that:

- a) The existing intersections evaluated as part of this study is currently operating at acceptable levels of service.
- b) The acceptable levels of service would remain relevant for at least the next ten years should the background vehicle traffic (non-Proposed Mining Development related traffic) grow at 3% per annum.
- c) No additional road infrastructure is required from a vehicle capacity point of view.
- d) Reserve vehicle capacity is available at the relevant intersections evaluated on the existing road network.

Refer to **Section 3** of this report for more information regarding required and/or recommended improvements and **Tables D-1 and D-2 of Appendix D** for the level of service criteria description respectively for unsignalised and signalised intersections. **Table 2.7** provide a summary of the available reserve capacity on the various sections of roads that were investigated.

TABLE 2.7: AVAILABLE RESERVE CAPACITY FOR RELEVANT ROAD SECTION WITHOUT THE PROPOSED MINING DEVELOPMENT

Point	Intersection	Direction of Road Section	Capacity per Lane	Number of Lanes	Total Capacity	Actual Number of Vehicles		Reserve Capacity Available		Actual Number of Vehicles		Reserve Capacity Available	
						2022 Existing without Proposed Mining Development		2022 Existing without Proposed Mining Development		Projected 2032 without Proposed Mining Development		Projected 2032 without Proposed Mining Development	
						AM	PM	AM	PM	AM	PM	AM	PM
A	Intersection of Roads N17 and D1426	North (Road N17)	1100	1	1100	57	146	1043	954	77	196	1023	904
		South (Road N17)	1100	1	1100	61	78	1039	1022	82	105	1018	995
		West (Road D1426)	600	1	600	3	1	597	599	4	1	596	599
B	Road D1426 and Proposed Development Access Road	Intersection is a proposed intersection as part of the Proposed Mining Development.											
C	Intersection of Roads R36, D1426, and Breyten Access Road	North (Road R36)	1100	1	1100	88	93	1012	1007	118	125	982	975
		East (Road D1426)	600	1	600	4	2	596	598	5	2	595	598
		South (Road R36)	1100	1	1100	77	105	1023	995	104	141	996	959
		West (Breyten Acc)	800	1	800	16	52	784	748	21	69	779	731

2.5 OTHER TRAFFIC-RELATED MATTERS





Table 2.8 provides a summary of the following:

- a) Road safety matters.
- b) Road Conditions.
- c) Non-motorised transport.
- d) Public transport.

TABLE 2.8: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS

Item	Description of Element	General Comments	Specific Issues	Actions Required
1.	ROAD SAFETY MATTERS			
1.1	General road safety	<p>The following are typical elements related to the road network, which cause road safety problems in rural and urban areas, and which need to be addressed on a continuous basis:</p> <ul style="list-style-type: none"> a) Intersection layout, with specific reference to dedicated right-turn lanes, where there is heavy vehicle movement. b) Pedestrian movements (road crossings). c) Intersection alignment, such as staggered intersections. d) Insufficient public transport facilities. e) Access control for vehicle movement. f) Fencing to control animal movement. g) Lack of or deterioration of reflective road studs for visibility during the night at strategic points. h) Lack of pedestrian walkways to separate pedestrian and vehicle movements at strategic points. i) Lack of provision and quality of road markings. j) Lack of provision and quality of road signs. k) Improper road safety training for workers as well as adjacent communities. 	<ul style="list-style-type: none"> a) Points A and C does not have any dedicated right-turn lanes and Point A no left-turn deceleration lanes. Although a concern at intersections with noticeable volumes of right turning vehicles on a regular basis, the current circumstances does not raise any concern due to low volumes of vehicles at the relevant intersections. 	<ul style="list-style-type: none"> a) None.
2.	ROAD CONDITIONS			
2.1	Road Condition of Road D1426	<p>Road D1426 is currently a gravel road between Points A and C, providing access from and to farms within the area, and as proposed in the future to the Proposed Mining Development. Broader access by Road D1426 is provided to Road N17 on the south, and Road R36 on the north.</p>	<ul style="list-style-type: none"> a) Currently Road D1426 is in a poor state from the northern boundary of the Proposed Mining Development (Point B) up to Point C. 	<ul style="list-style-type: none"> a) Recommendations should be made by Pavement Design specialist in terms of the economic viability compared to repairing of the road and the longer distance that might need to be travelled if not repaired.

TABLE 2.8: SUMMARY OF OTHER TRAFFIC-RELATED MATTERS (Continue...)

Item	Description of Element	General Comments	Specific Issues	Actions Required
2.	ROAD CONDITIONS (Continue...)	Pictures of Road D1426: Poor road condition north of Proposed Mining Development		
				
				
3.	NON-MOTORISED TRANSPORT			
3.1	Non-motorised transport	a) No pedestrian. Bicycle or donkey cart activity was observed during a site visit at Point A, with some activity at Point B.	a) No issues without the Proposed Mining Development.	a) None.
4.	PUBLIC TRANSPORT			
4.1	Public transport	a) Two types of public transport commuters are relevant to the area under investigation: i) Firstly, workers who travel to and from the area. ii) Secondly, visitors to the area. In general, no public transport is available within the area of the Proposed Mining Development along Road D1426, with the nearest possible public transport operations available being approximately 16 kilometres to the north of the Proposed Mining Development at Breyten.	a) Depending on where workers will be sourced from, workers of the Proposed Mining Development might have difficulties to get to and from work if making use of public transport.	a) Contracted transport for workers is recommended. Consultation with existing operators in nearby towns should be conducted.

2.6 SENSITIVE ROAD SECTIONS AND INTERSECTIONS RELATED TO EXISTING CONDITIONS

Sensitive road sections and intersections related to existing conditions **without** the Proposed Mining Development in terms of vehicular traffic typically include the following:

- a) Where residents and schools are located (vehicle/non-motorized transport conflict).
- b) Free-flow legs of intersections where right-turning movements take place and where no dedicated right-turn lanes are provided.
- c) Intersections with high volumes of vehicular traffic conflicts.
- d) Pavement Condition.
- e) Speeding.

The following figures are presented as part of the sensitive road sections **without** the Proposed Mining Development:

- a) **Figure 2.4:** Sensitive road sections and intersections indicating existing sensitive areas and intersections **without** the Proposed Mining Development (Status Quo).

It can be concluded from **Figure 2.4** that:

- a) Road D1426 is a gravel road (unpaved). Visually the road is in a poor condition between Points B and C. Depending on the intended load on the roadway, a Pavement Design Specialist will have to comment on the road. The last mentioned will also be impacted by the vehicle trip distribution to be generated by the Proposed Mining Development.
- b) The relevant existing roads under investigation has a low sensitivity in terms of vehicle traffic volumes and conflicts between vehicles and non-motorized transport.
- c) Although the existing intersections (Points A and C) currently does not have dedicated right-turn or left-turn deceleration lanes, a low volume of right turning vehicles were observed during the relevant survey conducted. It is therefore rated at a low sensitivity without the Proposed Mining Development.

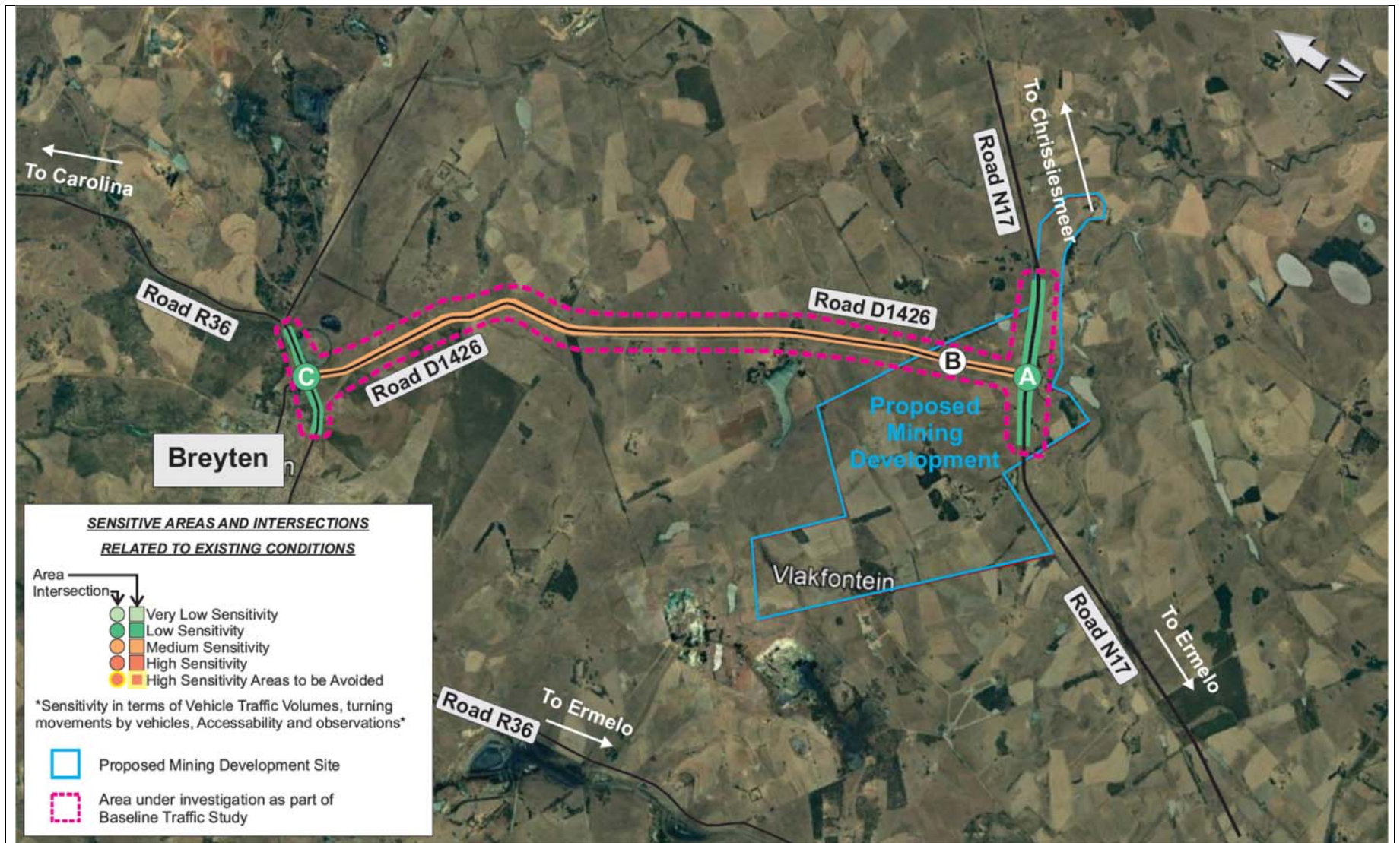


FIGURE 2.4: SENSITIVE ROAD SECTIONS AND INTERSECTIONS INDICATING EXISTING SENSITIVE AREAS AND INTERSECTIONS WITHOUT THE PROPOSED MINING DEVELOPMENT (STATUS QUO)

3. FINDINGS AND RECOMMENDATIONS

Based on a site inspection of the existing road network adjacent to the site under investigation, traffic surveys, calculations, reference to the relevant traffic engineering guideline documents, screening report and site sensitivity verification, the following findings and recommendations were made:

3.1 FINDINGS

Based on the investigations conducted as part of this study, the following findings were concluded:

- g) Access to and from the Proposed Mining Development would be required from Road D1426 which is a gravel (unpaved) provincial class R4 road. Three viable access options (options 2, 3 and 4) were identified, therefore determining that access to and from the Proposed Mining Development would be possible from Road D1426.

Access can potentially be provided for options 2, 3 and 4 from and to Road D1426. Access option 3 is deemed as the most suitable and therefore the recommended point of access based on:

- i) The available sight distances.
 - ii) The proposed layout of the Proposed Mining Development (where infrastructure will be located).
 - iii) From a road geometric perspective.
- h) Road D1426 is currently a gravel road between Points A and C, providing access from and to farms within the area, and as proposed in the future to the Proposed Mining Development. Broader access by Road D1426 is provided to Road N17 on the south, and Road R36 on the north. Currently Road D1426 is in a poor state from the northern boundary of the Proposed Mining Development (Point B) up to Point C.
 - i) In general, no public transport is available within the area of the Proposed Mining Development along Road D1426, with the nearest possible public transport operations available being approximately 16 kilometres to the north of the Proposed Mining Development at Breyten. Depending on where workers will be sourced from, workers of the Proposed Mining Development might have difficulties to get to and from work if making use of public transport.
 - j) The existing intersections investigated (Points A and C) does not have dedicated right-turn lanes.
 - k) Intersection performance evaluations concluded that the relevant existing intersections with existing vehicle traffic volumes are currently operating at acceptable levels of service and would remain relevant for at least the next ten years with an anticipated background vehicle traffic growth (which includes latent developments) of 3% per annum.
 - l) Reserve vehicle capacity along Roads N17, R36 and D1426 is available and is anticipated to remain relevant for the next ten years.

3.2 SUMMARY OF DESKTOP VERIFICATION OUTCOME

Table 3.1 provides a summary of the findings as part of the desktop verification outcome.

TABLE 3.1: SUMMARY OF DESKTOP VERIFICATION OUTCOME				
ELEMENT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/P LAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Road Safety: Vehicle/non-motorized transport conflict	No protocol.	Low	Low number of non-motorized movement observed in area. No further input required.	Section 2.6.
Road Safety: Need for dedicated turning lanes	No protocol.	Low	No dedicated turning lanes provided at Points A and C, not currently required due to low vehicle volumes. Assess change with the anticipated vehicle traffic to be generated by the Proposed Mining Development.	Table 2.8.
Road Safety: High volumes of vehicular traffic conflicts (turning movements)	No protocol.	Low	Currently low volume of vehicle traffic in area. Assess change with the anticipated vehicle traffic to be generated by the Proposed Mining Development.	Section 2.1.3.
Pavement Condition (Road D1426)	No protocol.	Medium	Road D1426 is a gravel road (unpaved). Visually the road is in a poor condition between Points B and C. Depending on the intended load on the roadway, a Pavement Design Specialist will have to comment on the road.	Table 2.8.
Speeding	No protocol.	Low	No excessive speeding was observed on relevant road sections under investigation. No further input required.	Not relevant.

3.3 NEED FOR CONDUCTING A TRAFFIC IMPACT ASSESSMENT AND ADDITIONAL EVALUATIONS AS PART OF THE PROPOSED MINING DEVELOPMENT

Based on the “COTO, TMH 16 Volume 1 South African Traffic Impact and Site Traffic Assessment Manual Version 1.0 August 2012” (Traffic Assessment Thresholds):

- a) **Section 2.6.2** prescribes: “A Traffic Impact Assessment shall be undertaken and submitted when an application is made for a change in land use and when the highest total additional hourly vehicular trip generation (including pass-by and diverted trips) as a result of the application exceeds 50 trips per hour”
- b) **Section 2.6.3** furthermore indicates: “A Site Traffic Assessment shall be undertaken and submitted whenever:
 - ✓ An application is submitted for the erection of a building or other structure (roads and other) on a site for which a Site Development Plan (SDP) is required.
 - ✓ Proposals are made for transportation facilities (roads and other) in a township during Township Establishment.”
- c) **Section 2.5.1** indicates: “The purpose of a Site Traffic Assessment (STA) is to assess whether transportation facilities proposed in a Site Development Plan (SDP) or for a township during Township Establishment meet the standards and requirements prescribed in this manual. SDPs are plans that the Municipality require of a landowner intending to erect or alter any buildings or other structures on a development site”;
- d) **Section 2.5.2** indicates: “The STA involves only the site or township that is being developed and covers the site or township transportation facilities as well as accesses to the site or township. The primary purpose of the assessment is to evaluate proposed accesses, on-site roads, parking provision, loading facilities, public transport facilities, pedestrian arrangements and other transportation facilities.”; and
- e) **Section 2.5.3** indicates: “The Applicant is responsible for undertaking the STAs. Such assessments may be submitted as part of the TIA when application is made for a change in land-use rights. The Applicant may, however, also first submit the STA at a later stage.”

Due to information on the anticipated number of vehicle trips to be generated by the Proposed Mining Development during the operational phase not being available at the time of preparing this report, the requirement of whether further investigations would be required could not be based on calculations. Therefore, the recommendation had to be made based on professional experience obtained from several similar projects completed.

Coal mining developments where no rail infrastructure is available generate a noticeable number of vehicle trips, mainly due to the activities of trucks transporting coal off-site to customers.

The following should be determined as part of a Traffic Impact Assessment for the dedicated area with the Proposed Mining Development:

- a) Determination of vehicle trips expected to be generated by the Proposed Mining Development.
- b) Determination of anticipated traffic to be generated at the intersections under investigation.
- c) Determination of Levels of Service at the relevant intersections with the Proposed Mining Development (Intersection performance).
- d) Determination of mitigating measures required as part of the Proposed Mining Development.
- e) Determine road related impact due to the Proposed Mining Development.

3.4 RECOMMENDATIONS AND TERMS OF REFERENCE FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

The following recommendations are made from a traffic engineering point of view and need to form part of the EIA process:

- a) It is recommended that a full Traffic impact Assessment be prepared in order to assess the potential road related impact that the transportation of coal from the Proposed Mining Development would have on the relevant intersections under investigation from a road capacity and safety perspective, and to determine the required mitigating measures in order to mitigate the potential road related impact that the Proposed Mining Development might have.
- b) Further investigation at the relevant proposed access intersection to and from the Proposed Mining Development should be conducted regardless of whether Access options 2, 3 or 4 will be implemented in order to determine the intersection performance (impact) of the anticipated vehicle trips to be generated by the Proposed Mining Development.
- c) Further investigation is recommended for on-site traffic related matters which include vehicle circulation and parking layouts.

3.5 POTENTIAL ROAD RELATED CONSTRAINTS, FATAL FLAWS AND RED FLAGS AS PART OF THE PROPOSED MINING DEVELOPMENT

Anticipated vehicle traffic to be generated by the Proposed Mining Development, with specific reference to heavy vehicles transporting coal, would have an impact on the existing gravel road, Road D1426. This could contribute to the deteriorating condition of the roadway and could lead to the Proposed Mining Development not being accessible via Road D1426 should the road not be maintained. The last mentioned is regarded as a potential constraint and fatal flaw should Road D1426 not be maintained.

No further road related constraints, fatal flaws or red flags that could have an impact on the feasibility of the Proposed Mining Development are envisaged or could be identified as part of this study for the existing road network in terms of road safety and capacity. Further investigation by means of preparing a full Traffic Impact Assessment is although required in order to determine the road related impact that the Proposed Mining Development might have, and the required mitigating measures should any be required.

APPENDIX A

INFORMATION RELATED TO STATUS QUO

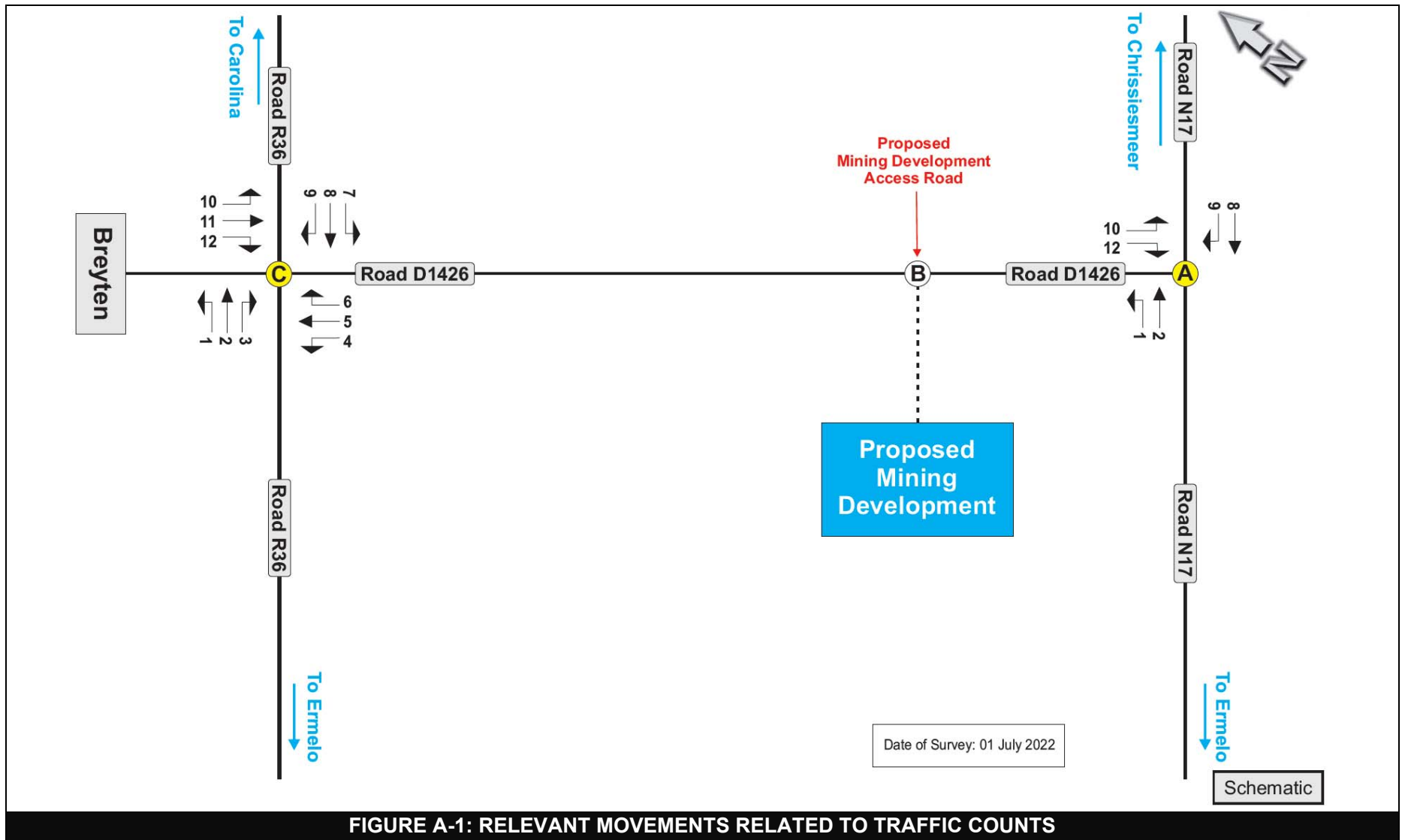


FIGURE A-1: RELEVANT MOVEMENTS RELATED TO TRAFFIC COUNTS

TABLE A-1: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROADS N17 AND D1426 (POINT A)

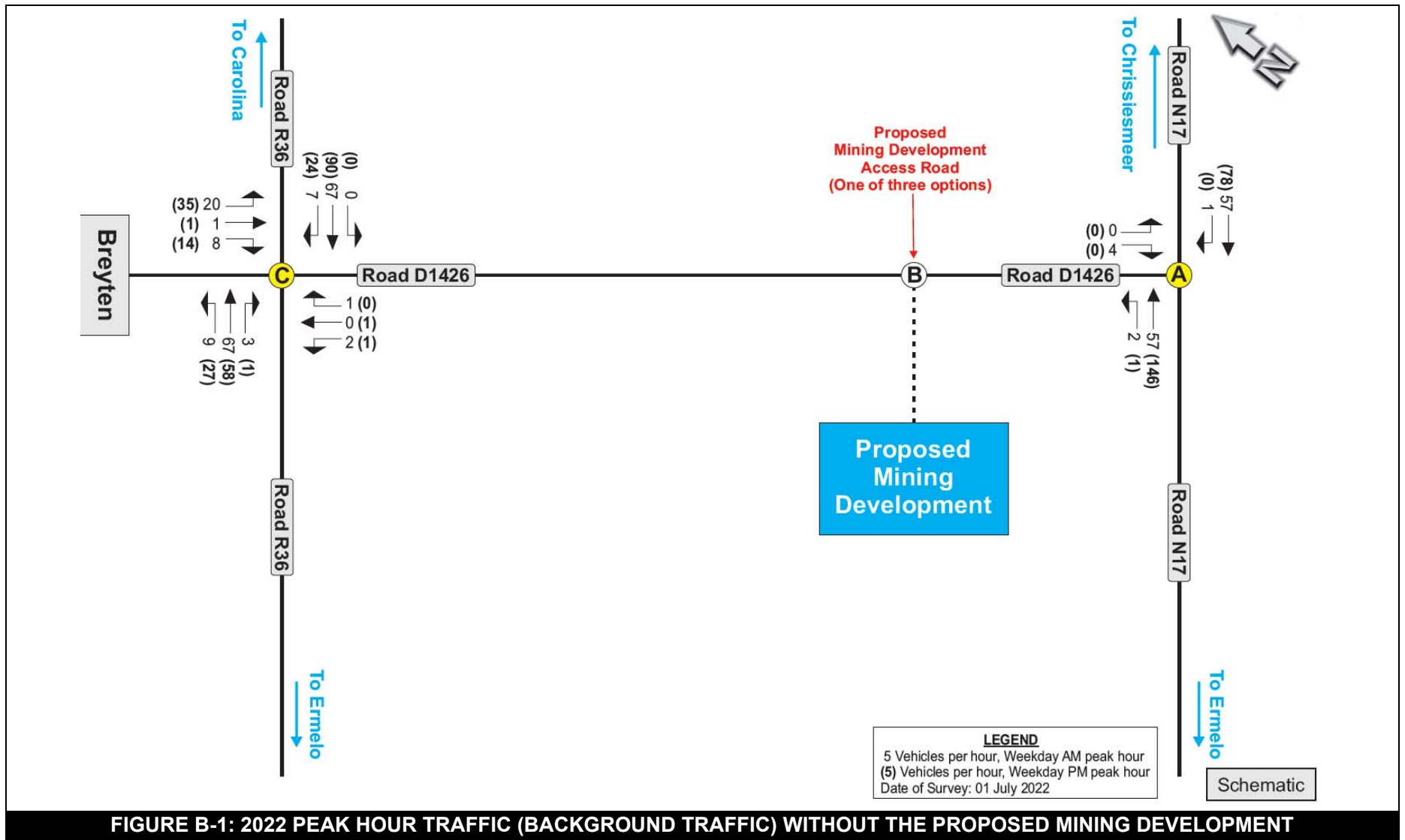
TIME INTERVALS	MOVEMENTS						TOTAL
	1	2	8	9	10	12	
06:00-07:00	0	52	30	0	1	0	83
06:15-07:15	2	55	41	0	1	1	100
06:30-07:30	2	54	50	0	1	1	108
06:45-07:45	2	57	57	1	0	4	121
07:00-08:00	2	48	58	1	0	4	113
07:15-08:15	0	45	57	1	0	3	106
07:30-08:30	0	44	63	1	0	3	111
07:45-08:45	0	45	69	0	0	0	114
08:00-09:00	1	55	68	0	0	0	124
08:15-09:15	1	62	73	0	0	0	136
08:30-09:30	1	76	77	0	0	0	154
08:45-09:45	1	80	88	0	0	0	169
09:00-10:00	0	78	82	0	0	0	160
09:15-10:15	0	77	87	0	0	0	164
09:30-10:30	0	73	79	0	0	0	152
09:45-10:45	0	71	76	0	0	0	147
10:00-11:00	0	74	90	0	0	0	164
10:15-11:15	1	80	98	0	0	1	180
10:30-11:30	1	77	106	0	0	1	185
10:45-11:45	1	83	100	0	0	1	185
11:00-12:00	1	91	99	0	1	1	193
11:15-12:15	2	91	87	1	1	1	183
11:30-12:30	3	87	73	1	1	1	166
11:45-12:45	3	94	78	1	1	1	178
12:00-13:00	3	98	81	1	0	1	184
12:15-13:15	1	115	83	0	0	1	200
12:30-13:30	0	117	97	0	0	2	216
12:45-13:45	0	127	89	0	1	2	219
13:00-14:00	0	114	85	0	1	2	202
13:15-14:15	1	99	76	0	1	2	179
13:30-14:30	3	103	85	0	1	1	193
13:45-14:45	3	112	77	0	0	1	193
14:00-15:00	3	127	83	0	0	1	214
14:15-15:15	3	130	85	1	1	0	220
14:30-15:30	1	147	70	1	1	0	220
14:45-15:45	1	137	89	1	1	0	229
15:00-16:00	1	136	81	1	1	0	220
15:15-16:15	0	136	78	0	0	0	214
15:30-16:30	0	125	74	0	0	1	200
15:45-16:45	0	130	72	0	0	1	203
16:00-17:00	0	128	73	0	0	1	202
16:15-17:15	1	130	80	0	0	1	212
16:30-17:30	1	146	78	0	0	0	225
16:45-17:45	1	134	62	0	0	1	198
17:00-18:00	1	127	58	0	0	1	187

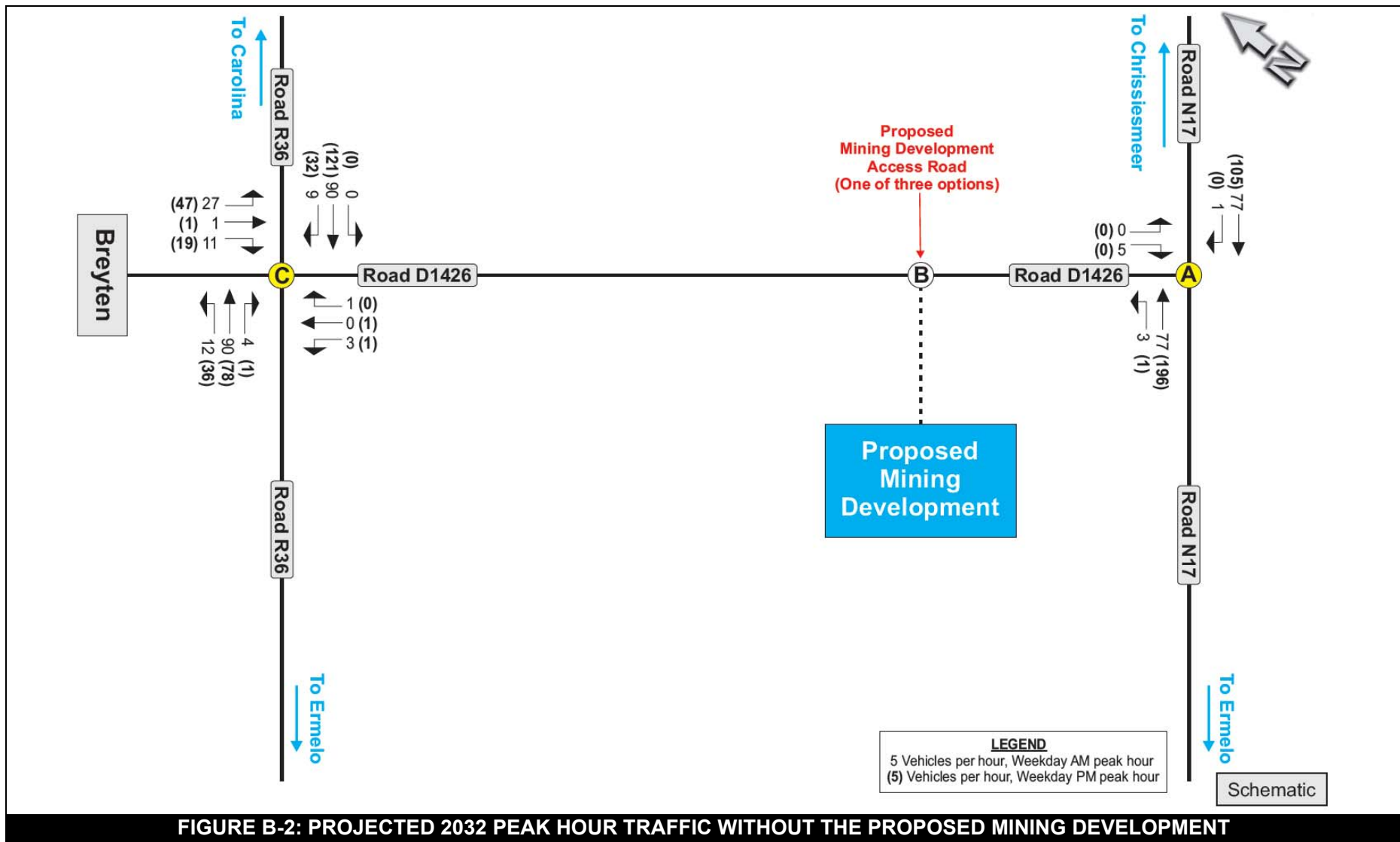
TABLE A-2: HOURLY TRAFFIC COUNTS FOR ALL VEHICLES SIMULTANEOUSLY AT THE INTERSECTION OF ROADS R36, D1426, AND BREYTEN ACCESS ROAD (POINT C)

TIME INTERVALS	MOVEMENTS												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
06:00-07:00	10	45	0	0	1	0	1	62	13	33	0	2	167
06:15-07:15	8	55	3	0	1	0	1	70	10	27	0	4	179
06:30-07:30	9	58	3	2	1	1	1	66	9	18	1	4	173
06:45-07:45	10	73	3	2	1	1	1	60	5	18	1	5	180
07:00-08:00	9	67	3	2	0	1	0	67	7	20	1	8	185
07:15-08:15	9	62	0	2	0	1	0	69	8	16	1	7	175
07:30-08:30	11	65	0	1	0	0	0	76	7	16	0	7	183
07:45-08:45	9	52	1	3	0	0	0	72	10	16	1	7	171
08:00-09:00	9	66	1	3	2	0	0	68	7	14	1	4	175
08:15-09:15	9	65	2	3	2	0	0	71	10	12	3	3	180
08:30-09:30	8	70	2	4	2	0	0	68	13	17	4	3	191
08:45-09:45	7	77	2	4	2	0	0	71	15	19	3	2	202
09:00-10:00	6	75	2	4	1	0	0	67	16	22	3	2	198
09:15-10:15	7	76	1	4	1	0	0	70	17	27	1	4	208
09:30-10:30	7	73	2	2	1	0	0	60	21	28	2	5	201
09:45-10:45	7	75	2	2	1	0	1	62	22	30	2	5	209
10:00-11:00	7	66	2	2	0	0	1	65	24	32	2	8	209
10:15-11:15	5	61	2	3	0	0	2	54	19	31	2	11	190
10:30-11:30	3	62	2	3	0	0	2	64	18	29	1	11	195
10:45-11:45	4	63	1	3	0	1	1	61	18	26	1	11	190
11:00-12:00	5	68	1	4	1	1	1	58	19	24	1	11	194
11:15-12:15	9	71	3	3	4	1	0	72	22	22	1	7	215
11:30-12:30	10	72	2	4	4	1	0	79	19	21	1	6	219
11:45-12:45	10	69	2	2	4	0	0	96	22	20	1	5	231
12:00-13:00	10	75	2	2	3	0	0	97	24	19	1	4	237
12:15-13:15	7	71	0	2	0	1	0	87	25	20	1	5	219
12:30-13:30	6	60	0	1	0	1	0	73	27	19	0	6	193
12:45-13:45	8	67	0	2	0	1	0	54	26	18	1	7	184
13:00-14:00	8	61	1	1	0	1	0	50	22	20	2	12	178
13:15-14:15	8	71	1	4	0	0	0	51	25	16	2	13	191
13:30-14:30	9	90	1	4	0	0	0	60	26	14	2	13	219
13:45-14:45	8	90	1	3	0	0	0	74	29	16	1	13	235
14:00-15:00	8	84	3	3	0	0	0	82	31	13	0	9	233
14:15-15:15	7	83	3	1	0	0	0	87	24	17	0	6	228
14:30-15:30	8	71	4	1	0	0	0	97	25	24	1	7	238
14:45-15:45	11	90	4	1	0	0	0	80	18	26	2	7	239
15:00-16:00	15	86	1	1	1	0	0	90	23	27	4	4	252
15:15-16:15	17	82	1	1	2	0	0	82	28	30	4	5	252
15:30-16:30	20	84	1	1	2	0	0	76	27	29	3	7	250
15:45-16:45	24	52	1	1	2	0	0	88	31	29	3	9	240
16:00-17:00	27	58	1	1	1	0	0	90	24	35	1	14	252
16:15-17:15	30	54	1	0	1	0	0	85	20	34	2	16	243
16:30-17:30	32	45	0	0	1	0	0	79	19	36	2	12	226
16:45-17:45	30	41	2	0	1	0	0	80	15	38	1	10	218
17:00-18:00	27	32	2	2	1	0	0	55	16	34	3	6	178

APPENDIX B

TRIP INFORMATION RELATED TO THE EXISTING TRAFFIC





APPENDIX C

SIDRA CALCULATION RESULTS

**TABLE C-1: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2022
(BACKGROUND TRAFFIC) WITHOUT THE PROPOSED MINING DEVELOPMENT
(SCENARIO 1)**

POINT A: INTERSECTION OF ROADS D1426 AND PROPOSED DEVELOPMENT ACCESS ROAD						
<i>Type of intersection control: Free flow on Road N17</i>						
Levels of Service Acceptable						
APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road N17)	0.1	A	0.037	0.1	A	0.050
South (Road N17)	0.2	A	0.037	0.1	A	0.090
West (Road D1426)	9.9	A	0.007	8.6	A	0.002
Intersection	0.6	A	0.037	0.1	A	0.090
POINT C: INTERSECTION OF ROADS R36, D1426, AND BREYTEN ACCESS ROAD						
<i>Type of intersection control: Free flow on Road R36</i>						
Levels of Service Acceptable						
APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R36)	0.7	A	0.057	14	A	0.093
East (Road D1426)	9.1	A	0.006	11.0	B	0.006
South (Road R36)	0.9	A	0.052	1.9	A	0.043
West (Breyten Access)	10.0	B	0.043	9.9	A	0.072
Intersection	2.4	A	0.057	3.4	A	0.093

**TABLE C-2: LEVELS OF SERVICE FOR VARIOUS APPROACHES FOR THE YEAR 2026
WITHOUT THE PROPOSED MINING DEVELOPMENT (SCENARIO 2)**

POINT A: INTERSECTION OF ROADS D1426 AND PROPOSED DEVELOPMENT ACCESS ROAD						
<i>Type of intersection control: Free flow on Road N17</i>						
Levels of Service Acceptable						
APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road N17)	0.1	A	0.050	0.1	A	0.067
South (Road N17)	0.2	A	0.051	0.0	A	0.121
West (Road D1426)	10.3	B	0.009	9.0	A	0.002
Intersection	0.5	A	0.051	0.1	A	0.121
POINT C: INTERSECTION OF ROADS R36, D1426, AND BREYTEN ACCESS ROAD						
<i>Type of intersection control: Free flow on Road R36</i>						
Levels of Service Acceptable						
APPROACH	FRIDAY (AM)			FRIDAY (PM)		
	Delay	Level of Service	Degree of Saturation	Delay	Level of Service	Degree of Saturation
North (Road R36)	0.7	A	0.076	1.5	A	0.126
East (Road D1426)	9.4	A	0.007	12.2	B	0.006
South (Road R36)	0.9	A	0.070	1.9	A	0.057
West (Breyten Access)	10.6	B	0.062	10.5	B	0.106
Intersection	2.5	A	0.076	3.5	A	0.126

APPENDIX D

LEVEL OF SERVICE CRITERIA DESCRIPTION

TABLE D-1: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR UNSIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	AVERAGE TOTAL DELAY (SEC/VEH)	PERFORMANCE EVALUATION
A	≤ 5	Excellent
B	> 5 and ≤ 10	Very Good
C	>10 and ≤ 20	Good
D	>20 and ≤ 30	Average
E	>30 and ≤ 45	Poor
F	>45	Fail

TABLE D-2: LEVEL OF SERVICE CRITERIA DESCRIPTION FOR SIGNALISED INTERSECTIONS		
LEVEL OF SERVICE	AVERAGE TOTAL DELAY (SEC/VEH)	PERFORMANCE EVALUATION
A	≤ 5	Excellent
B	> 5 and ≤ 15	Very Good
C	> 15 and ≤ 25	Good
D	> 25 and ≤ 40	Average
E	> 40 and ≤ 60	Poor
F	> 60	Fail

Level of Service criteria obtained from *The Highway Capacity Manual (Special Report 2009)*

APPENDIX E

PROFESSIONAL REGISTRATION AND CIRICULAM VITAE



ENGINEERING COUNCIL OF SOUTH AFRICA

10-Sep-2021 12:59

Profile Number : ECSA-00080528
Tel : +27 82 371 0253
Email : leon@siyazi.co.za

Mr,L,Roets
P O Box 11182

Bendor Park
0713

Dear Leon Roets

RENEWAL OF REGISTRATION(s) IN TERMS OF SECTION 22(1) OF THE ENGINEERING PROFESSION ACT, 2000 (ACT 46 OF 2000)

Please be informed that your application for the renewal of your registration(s), in terms of Section 22(1) of the Engineering Profession Act, 2000 (Act 46 of 2000), has been successful and your registration(s) has been renewed for a further period of (5) years until 14-Nov-2026 00:00, subject to you paying your annual fees.

Congratulations, on the continued recognition of your status with the Engineering Council of South Africa.

Yours Faithfully

Ms Carmen Wright

Manager: Education and CPD

ecsas.co.za

ENGINEERING COUNCIL OF SOUTH AFRICA
1st Floor Waterview Corner 2 Ernst Oppenheimer Ave Bruma
Private Bag X691 Bruma Johannesburg South Africa 2026
Tel: +27 11 607 9500 | Fax: +27 11 622 9295 | E-mail: engineer@ecsas.co.za

Suid-Afrikaanse Raad vir Ingenieurswese



Hiermee word
gesertifiseer
dat

Leon Roets

geregistreer is as

Professionele Ingenieur

kragtens die Wet op die Ingenieurswese-professie van Suid-Afrika
1990 (Wet 114 van 1990)

Datum *14 November 1996*

Registrasienommer *960547*

President

Registrateur





Die Suid-Afrikaanse Instituut van Siviele Ingenieurswese

Hiermee word gesertifiseer dat

Leon Roetz

behoorlik verkies is as

Lid

Lidnommer: 206744

van

Die Suid-Afrikaanse
Instituut van Siviele Ingenieurswese
op

29 September 2006

Uitgereik onder die seël van die Instituut
Onder resoluë van die Raad

President

Uitvoerende Direkteur





SOUTH AFRICAN ROAD FEDERATION

This is to certify that

Leon Roets

ID No: 6510145135085

Has successfully attended a 5 day course on

ROAD SAFETY AUDITS

CPD VALIDATION NUMBER: SARF14/0003/17 (5 CREDITS)

SARF

better roads

Stefan Lotter
Presenter

Innocent Jumo
SARF President

13TH JULY – 17TH JULY 2015
GAUTENG – SANRAL – NORTHERN REGION

TRANSPORT & TRAFFIC ENGINEER CV

PERSONAL PARTICULARS

Name and Surname: Leon Roets
 Identity Number: 6510145135085
 Nationality: South African
 Prof. Registration: 960547 - Professional Engineer



ACADEMIC QUALIFICATIONS

B Eng. (Civil Eng.) University of Pretoria, 1988

PROFESSIONAL MEMBERSHIP

Engineering Council of South Africa (ECSA)
 Southern African Institute of Civil Engineering (SAICE)

EMPLOYMENT RECORD

07/1996 – Current: Director and shareholder to SIYAZI Group of Companies
 11/1994 – 06/1996: Representative of Africon Consulting Engineers Inc., Transportation Planning Division in the then Northern Province, based in Polokwane
 08/1992 - 10/1994: Africon Consulting Engineers Inc., Transport Planning Division in Pretoria
 06/1990 - 08/1992: Lexetran, Transport Planning Division of the then Van Wyk & Louw Group

Leon Roets has a total of 32 years' experience of Transport and Traffic Engineer with wide experience in transportation planning and modelling, data processing as well as Traffic Impact Studies. He further was involved as part of Taxi Industry related projects for the past 25 years.

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:

PROJECT	CLIENT	DEVELOPMENT	
		SIZE	STATUS
a) Anglo American Project Smartpower: Hydrogen Production Plant at Mogalakwena Mine - Traffic Specialist Study	SLR Consulting	N/a	Busy with Study
b) Contract SANRAL R.518-020-2019 /1F - for Consulting Engineering services for the Upgrading on National Route R518 Section 2 from Mapeta (KM 97.5) to Mokopane (KM 102.2)	iX engineers (Pty) Ltd	N/a	Busy with Study
c) TIA for upgrading of Euphoria Shopping Centre Mookgophong	Naboom Commodities	9 100 m ²	Busy with Study
d) Contract SANRAL N.001-280-2020/1F - for Consulting Engineering Services for the Upgrade on National Route N1 Section 28 from Polokwane (KM 0.0) to Dwarsrivier (KM 49.0)	iX engineers (Pty) Ltd	N/a	Busy with Study
e) Road network planning for the CBD of Thohoyandou	KTN Consulting Engineers Project Managers	N/a	Busy with Study
f) Keaton Energy Holdings Limited (KEHL): Leeuw Braakfontein Colliery (Pty) Ltd [LBC] - Opencast & Underground Mining	Letsolo Water and Environmental Services	N/a	TIA done for EIA
g) Kudumane Manganese Resources Expansion Project, near Hotazel in the Northern Cape Province	SRK Consulting	N/a	TIA done for EIA
h) Proposed Township Establishment Remainder of Portion 16 of the Farm Tweefontein 915 LS, Limpopo	Specon CC	N/a	TIA done.
i) Proposed Virginia Solar Park, Free State Province	Ages Limpopo (Pty) Ltd	N/a	TIA done for EIA
j) Limpopo Central Hospital	Sakhiwo Health Solutions (Limpopo) (Pty) Ltd	488 Beds	TIA Approved
k) Proposed Filling Station on Giyani D2 Ext 1	Rivoni (Pty) LTD	18 000 m ²	Busy with Study
l) Proposed Development on remainder of portions 166 & 168 of the farm Tweefontein 915-LS	Natura Professional Planners	N/a	TIA Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:			
PROJECT	CLIENT	DEVELOPMENT	
		SIZE	STATUS
m) Proposed Ga-Sekgopo Filling Station to be situated on the Farm Uitspanning 820 LS, Road R81, Ga-Sekgopo, Greater Letaba Local Municipality, Limpopo Province (Rest and Service Facilities)	Rivoni (Pty) LTD	N/a	Busy with Study
n) Proposed Access application to Filling Station on Portion 44 of the farm Deer Park 459 Mopani	BF Branded Marketer	N/a	Done.
o) Shopping Centre Siloam	Illungile Consulting Services	8 700m ²	Constructed.
p) Traffic Impact Assessment for Student Accommodation at TUT on corner of Mark and Hospital Street	Seco Construction Project Managers	1057 beds	TIA approved.
q) Proposed Pfunanani Special School, Giyani	PG Consulting Engineers (Pty) Ltd	500 students	TIA approved.
r) Nkuzana City and Filling station development	Masingita Group of Companies	120 000m ²	Busy with Study.
s) Traffic Impact Assessment for Proposed Filling Station on Road R37 Thokwaneng	Matome Rapotu	N/a	TIA approved.
t) New Dwarsrivier Mine Heavy Vehicle Access Traffic Impact Assessment	Neda Engineering Group (PTY) Ltd	N/a	Constructed
u) Development to be on Portion 39 of the Farm Koppiefontein 686-LS	Nhlatse Planning Consultants	N/a	Approved
v) Township Layout Plan, Portion 145 of the Farm Tweefontein 915 LS	Nhlatse Planning Consultants	N/a	Approved
w) Upgrading of the Existing Access to the New Clydesdale Colliery-Site Traffic Assessment	Universal Coal PLC	N/a	In Process
x) Twin City Rustenburg Taxi Facilities	Twin City Development (Pty) Ltd.	N/a	Constructed
y) Widening and upgrading of existing truck access to Xstrata Alloys Lion Ferrochrome	Xstrata Alloys Lion Ferrochrome	N/a	Constructed
z) Tengwa Africa Truck Stop	Prof Planners & Associates Town and Regional Planners	N/a	Approved
aa) Proposed West Wits Mining Development	SLR Consulting Engineers (Metago)	N/a	In Process
bb) Proposed access to Filling Station From Road D212 Dwarsrivier	Boulder Group of Companies	N/a	TIA approved
cc) Ficksburg Border Bridge - Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
dd) Maseru Border Bridge – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ee) Kopfontein Border – Port of Entry	NDOPW (Nhaletse Planning Consultants)	N/a	Study done.
ff) Pure Resource Mine, Parys	Pure Resource Mine	N/a	Planning
gg) University of Limpopo (Turloop Campus) RFT No: UL001/2014 - OFF Campus Student Residences	Zutari	6800 beds	Panning
hh) Polokwane 90MW PV Solar Plant	Phakanani Environmental	90MW PV	Planning
ii) Bolobedu Solar Site	Ages Limpopo (Pty) Ltd	75MW PV	Planning
jj) Makhado Regional Mall	Masingita Properties	45,000 m ²	Construction
kk) Giyani Regional Mall	Masingita Properties	60,000 m ²	Constructed
ll) Burgersfort Regional Mall with Taxi Rank with Taxi Facility implementation	Resilient Properties	45,000 m ²	Constructed
mm) Burgersfort Convenience Shopping Centre	Resilient Properties	28,000 m ²	Planning
nn) Ivydale Agricultural Holdings - Ilypark Ext 41, Ivydale 58 & 59	Arrow Creek Investments	20,000 m ²	Approved
oo) Elim Community Shopping Centre with Taxi Rank with Taxi Facility implementation	Twin City Development	14,000 m ²	Constructed
pp) Tzaneen Lifestyle Centre with Taxi Facility implementation	Resilient Properties	20,000 m ²	Constructed
qq) Morgenzon Township Developments Shopping & Residential (12,000 units)	Scarlet Ibis Twentieth	30,000 m ²	Approved
rr) Tzaneng Mall, Tzaneen with Bus Terminal implementation	Resilient Properties	40,000 m ² ,	Constructed
ss) Polokwane Convention and Exhibition Centre portions 84, 85, 86 and 87 Ivydale	BE Consult (Polokwane Municipality)	45,000 m ²	Approved

RELEVANT TRAFFIC ENGINEERING RELATED PROJECTS:			
PROJECT	CLIENT	DEVELOPMENT	
		SIZE	STATUS
tt) New complex for Builder's Warehouse, Tile Warehouse, Toyota, etc., when entering Polokwane on the N1 from Gauteng	Giurich Developments	50,000 m ²	Constructed
uu) BB Auto Development	Lessis Finance	25,000 m ²	Constructed
vv) Blue Haze Shopping Centre, Hazyview with Taxi Facility implementation	Twin City Developments	60,000 m ²	Constructed
ww) Tzaneen Crossing Shopping Centre, with Taxi Facility implementation	Resilient Properties	25,000 m ²	Constructed
xx) Standard Bank Building in Polokwane	BB Auto	20,000 m ²	Constructed
yy) Musina Shopping Centre	Bepro Group of Companies	15,000 m ²	Constructed
zz) Proposed development on Erf 1697, Pietersburg Extension 3	Business Partners Limited	10,000 m ²	Constructed
aaa) Motor City (Pietersburg Erf 7589, Traffic Impact Study)	Prism Architects	20,000 m ²	Constructed
bbb) Thohoyandou Intermodal Facility	LPDORT	N/a	Constructed
ccc) Jozini Shopping Centre, with Taxi Facility implementation	CK Projects	20 000 m ²	Constructed
ddd) Tugela Ferry Shopping Centre, with Taxi Facility implementation	CK Projects	20 000 m ²	Constructed
eee) Groblersdal Twin City Regional Shopping Centre upgrade existing Taxi Facility	Twin City Development	35 000m ²	Constructed
fff) Technical Advisor Polokwane for Taxi Industry Polokwane Integrated Rapid Public Transport System	Polokwane Municipality	N/a	In Process

SOME OF MR ROETS' OTHER TRAFFIC AND TRANSPORT ENGINEERING EXPERTISE AND EXPERIENCE INCLUDE THE FOLLOWING (PLEASE REFER TO ATTACHED TABLE FOR MORE DETAIL AND BREAKDOWN):

- a) Shopping Centre's that Range from 2 000 m² to 60 000 m²
- b) Various Filling Station Developments
- c) Integrated Transport Plans for Various Local and District Municipalities
 - Vhembe
 - Ba-Phalaborwa
 - Polokwane
 - Sekhukhune
 - Thulamela
 - Limpopo
 - Mogalakwena
- d) Public Transport Plans for Various Local and District Municipalities
 - Mopani
 - Vhembe
 - Tubatse
 - Capricorn
- e) Design and Layout of Traffic Light Systems
- f) Residential Development that varies from 100 to 12 000 stands

IN CONCLUSION THE FOLLOWING ARE RELEVANT:

The above-mentioned successful projects are a clear indication that Mr Roets is fully committed to sustainable development, and believes strongly in the following principles:

- a) Providing safe, secure and reliable traffic-related facilities
- b) Maintaining a balance between traffic engineering and the potential to create job opportunities. In other words, doing everything possible to take certain measures that would ensure the functionality of the proposed developments
- c) Acting as a link between the developer and the relevant authority to ensure that development takes place successfully
- d) Using his knowledge of local circumstances and conditions to the benefit of the local community, to stimulate job creation
- e) Using his expertise, experience and qualifications to best effect in the belief that these should serve as a catalyst for job creation as far as is practically possible.

Leon Roets has the distinct advantage of possessing profound knowledge of transport and traffic issues of engineering. This in-depth knowledge in various fields, combined with the extensive knowledge that Siyazi has gained and also his record of successful co-operation with transport-related role players, his knowledge of the road network and the transport environment, probably makes Leon Roets one of the best candidates to provide traffic-related input for this project.

SOME OF THE TRANSPORT PLANNING PROJECTS THAT LEON ROETS HAD BEEN INVOLVED IN, INCLUDE:

Authority / Project Description	Transport Forum	CPTR	OLS	RATPlan	PTP	ITP	LITP	D\CITP	Business Plans	Liaison	Public Transport Intermodal Facilities	Public Transport Facilities	Colour Coding	Transport Framework	Corridor Planning	Year
Taxi Industry Technical Advisor – Taxi Industry Polokwane Integrated Rapid System									Y	Y		Y			Y	2022-2011
Taxi Industry Technical Advisor – Taxi Industry Mangaung Integrated Rapid System																2022-2015
Polokwane Municipality Comprehensive Integrated Transport Plan (CITP)								Y								2021-2019
Matlosana NDPG Project for Jabulani Street upgrade										Y		Y				2015-2014
Elim Mall, Tzaneng Mall, Tzaneen Crossing, Tzaneen Lifestyle Centre, Burgersfort Mall, Malamulele												Y				2012-1998
Greater Tubatse Municipality	Y															2013-2003
Road R37 between Polokwane and Burgersfort (Dilokong Corridor)										Y					Y	2013-2003
Polokwane Intermodal Facilities, as part of Prism Consortium (Planning)											Y					2013-2010
Thohoyandou Intermodal Facilities, as part of MCE Consortium											Y					2013-2010
Giyani Intermodal Facility, Taxi Facilitation											Y					2013-2010
Giyani, Makhado, Thohoyandou, Burgersfort, Special advisor for Intersite											Y					2013-2010
Vhembe District Municipality								Y								2010
Burgersfort, Road Master Network															Y	2009-2007
Mogalakwena Local Municipality	Y															2009-2006
Ba-Phalaborwa Local Municipality						Y										2008
Mogalakwena Local Municipality							Y									2008
Mogalakwena, Relocation and Road Safety of Road N11															Y	2008
Fetakgomo Local Municipality	Y															2007-2005
Polokwane, 2010 Priority Statement (PTIS)									Y							2007-2005
Polokwane Local Municipality					Y	Y										2007
Mogalakwena Local Municipality					Y											2007
Polokwane Local Municipality	Y															2006-1997
Sekhukhune District Municipality		Y	Y	Y	Y	Y										2006
Limpopo Department of Roads and Transport													Y			2004
Part of team for Limpopo in Motion														Y		2004
Greater Tubatse Municipality		Y	Y	Y	Y	Y										2003
Capricorn District Municipality		Y														2003
Vhembe District Municipality		Y	Y		Y	Y										2003
Mopani District Municipality		Y	Y		Y	Y										2003
Pietersburg-Polokwane Transport Strategy						Y										2000
Polokwane, N1 Eastern bypass															Y	2000
Pietersburg-Polokwane Public Transport Strategy					Y											1997